

4/pets

10/549855

JC20 Rec'd PCT/PTO 23 SEP 2005

DESCRIPTION

INFORMATION PROCESSING APPARATUS

This application is the national phase under 35 U.S.C. § 371
5 of PCT International Application No. PCT/JP2004/005101 which has
an International filing date of April 8, 2004 and designated the
United States of America.

TECHNICAL FIELD

10 The present invention relates to an information processing
apparatus that is provided with means for storing information to be
processed and is capable of operating means for invalidating the
information.

15 BACKGROUND ART

Many printers in recent years are connected to a
communication network and provided with a network printer
function to receive image data from another apparatus such as a
personal computer (PC) connected to the communication network
20 and output an image. Further, multi-function apparatuses have
been commercialized in which printers are provided with a plurality
of functions such as a copying function to capture an image recorded
on a sheet as image data by scanning it, form an image based on the
captured image data and output the image, a facsimile function to
25 transmit and receive image data to and from an external facsimile

by use of facsimile communication, and a transmission function to transmit the captured image data to an external apparatus. In order to perform the image data processing in each function without stagnation, printers having such advanced multifunction are
5 provided with storing means such as a hard disk for storing information such as image data and have a parallel processing function to successively store the accepted information while successively processing the information already stored in the storage image.

10 To the printers as described above, a lot of PCs are connected through the communication network, so that a plurality of users can provide an image output instruction. For this reason, there is a possibility that the images outputted onto recording sheets on instructions from a plurality of users are mixed together in the
15 image discharge part and carried away by a wrong user by mistake. Therefore, a technology has been developed such that when receiving an image output job transmitted from a PC, the printer stores the job and waits without performing the image output and after the user inputs an output instruction by directly operating the
20 printer, the printer outputs the image. Japanese Patent Application Laid-Open No. 60-25385 discloses a technology such that a password is transmitted together with image data from a PC to the printer, the printer stores the image data and waits, and in case that the user inputs the correct password by directly operating
25 the printer, the printer outputs the image. Moreover, among such

printers, products have been developed that have a function to back up information associated with the processing on standby in order that even when the power is turned off while the processing is on standby, the image output can be performed after the power is
5 turned on again.

There are cases where information handled by printers includes confidential information such as documents including trade secrets, and security measures are necessary for the information stored in the storing means by the printer. In particular, in the
10 case of a printer in which the image data is stored until the correct password is inputted as disclosed in Japanese Patent Application Laid-Open No. 60-25385, in case that the function to back up the information associated with the processing on standby is provided, the information is not deleted but is stored even after the power is
15 turned off. For this reason, information such as image data can be taken out to the outside, for example, by reading out the information from an external apparatus or detaching the storing means, so that it is difficult to maintain the confidentiality of the information being handled.

20

DISCLOSURE OF INVENTION

The present invention is made in view of such circumstances, and an object thereof is to provide an information processing apparatus capable of maintaining the confidentiality of the
25 information to be processed, by limiting the function to back up the

stored information.

An information processing apparatus according to the present invention is characterized in that in an information processing apparatus provided with: storing means for storing
5 unprocessed information; and resuming means for resuming, in case that information processing is temporarily stopped and resumed, the information processing under a condition where the unprocessed information is stored in the storing means, the following are provided: invalidating means for invalidating information; means
10 for making the invalidating means operable so that after the information is processed, the invalidating means invalidates the processed information; and limiting means for limiting, in case that the invalidating means is operable, the operation of the resuming means and resuming the information processing under a condition
15 where part or all of the unprocessed information is deleted from the storing means.

An information processing apparatus according to the present invention is characterized in that in an information processing apparatus provided with: storing means for storing
20 unprocessed information; and resuming means for resuming, in case that information processing is temporarily stopped and resumed, the information processing under a condition where the unprocessed information is stored in the storing means, the following are provided: means for additionally making operable invalidating
25 means for invalidating, after information is processed, the processed

information; and limiting means for limiting, in case that the
invalidating means is operable, the operation of the resuming means
and resuming the information processing under a condition where
part or all of the unprocessed information is deleted from the storing
5 means.

An information processing apparatus according to the
present invention is characterized in that the resuming means is
provided with means for maintaining a condition where the storing
means stores the unprocessed information while the information
10 processing is stopped.

An information processing apparatus according to the
present invention is characterized in that the unprocessed
information comprises data to be processed and associated
information associated with the data, that the storing means is
15 provided with: first storing means for storing the data to be
processed; and second storing means for storing the associated
information including information necessary for reading out the
data to be processed from the first storing means, and that the
limiting means is structured so as to resume the information
20 processing under a condition where the associated information is
deleted from the second storing means.

An information processing apparatus according to the
present invention is characterized in that the second storing means
is structured so as to store the data to be processed, in a condition of
25 being encrypted.

According to the present invention, in an information processing apparatus provided with: storing means for storing unprocessed information; and resuming means for resuming, in case that the apparatus is turned off and resumed such as in case that the power is shut off and turned on again, the information processing under a condition where the unprocessed information is stored in the storing means, in case that invalidating means for invalidating the processed information is operable, the operation of the resuming means is limited, part or all of the unprocessed information is deleted and the information processing is resumed. The invalidating means is made operable by switching between operating state and non-operating state by setting or is made operable by being additionally provided. By resuming the processing under a condition where part or all of the unprocessed information is deleted, the information associated with the processing is prevented from continuing being stored in a condition where it can be taken out to the outside, thereby maintaining the confidentiality of the information to be processed.

Moreover, according to the present invention, the resuming means maintains the unprocessed information so as not to be lost even while the power is shut off, for example, by using a backup power source. The information that the process waits to perform can be processed even after the restart, so that convenience is maintained.

Moreover, according to the present invention, data to be

processed such as image data, and associated information including information necessary for reading out data such as an address where the data is stored are stored in the storing means, and in case that the invalidating means is operating, the processing is resumed
5 under a condition where the associated information is deleted. The associated information is lost after the restart, so that it is difficult to read out the data. This prevents the information associated with the processing from continuing being stored in a condition where it can be taken out to the outside, thereby maintaining the
10 confidentiality of the information to be processed.

Further, according to the present invention, by storing the data to be processed in a condition of being encrypted, it is made difficult to take out data such as image data to the outside for use in case that the invalidating means is not operating and it is facilitated
15 to maintain the confidentiality of the information.

BRIEF DESCRIPTION OF DRAWINGS

FIG. 1 is a block diagram showing the internal structure of a printer which is an information processing apparatus of the present
20 invention,

FIG. 2 is a schematic view showing the processing performed by the printer in case that an image is outputted,

FIG. 3 is a conceptual diagram showing an example of the contents of a job management table stored in a storage part, and

25 FIG. 4 is a flowchart showing the procedures of the operation

for the printer, which is an information processing apparatus of the present invention to turn off the main power.

BEST MODE FOR CARRYING OUT THE INVENTION

5 Hereinafter, the present invention will be concretely described based on the drawings showing an embodiment thereof.

FIG. 1 is a block diagram showing the internal structure of a printer, which is an information processing apparatus of the present invention. The printer 1 is an information processing apparatus of
10 the present invention, and is provided with a control part 101 comprising a CPU that performs computations and a RAM that stores temporary information involved in the computations. To the control part 101, a ROM 109 is connected that stores a control program for controlling the printer 1, and the control part 101
15 controls the entire printer 1 in accordance with the control program stored in the ROM 109. Moreover, to the control part 101, a management part 104 is connected that is a memory storing management information for managing the processing performed by the printer 1, and the control part 101 refers to the management
20 information stored in the management part 104 and controls the printer 1 based the information being referred to. Moreover, to the control part 101, the following are connected: an image reading part 107 that reads an image recorded on a sheet by scanning it and generates electronic image data based on the image being read out;
25 and an image forming part 108 that forms an image from the image

data, records the formed image onto a recording sheet and outputs the image, and the printer 1 functions as a copier that copies the image read out by the image reading part 107. Moreover, to the control part 101, a storage part 106 is connected that comprises a
5 hard disk or a nonvolatile memory. The storage part 106 is the first storing means according to the present invention, and the management part 104 is the second storing means according to the present invention. The storage part 106 stores the image data representative of the contents of the outputted image which is the
10 data to be processed, and the management part 104 stores a job management table in which job information which is the associated information according to the present invention associated with the image data such as the number of copies of the outputted image is summarized. Moreover, to the control part 101, an operation part
15 102 is connected that accepts operations from the user, and the operation part 102 comprises: display means such as a liquid crystal panel for displaying information necessary for the operations; and input means such as a touch panel or a numeric keypad to which information such as a control instruction is inputted by the user's
20 operation.

Further, to the control part 101, a communication part 103 is connected that is connected to an external communication network N1 such as a LAN, and the communication part 103 exchanges information with the outside through the communication network
25 N1. A plurality of PCs 2 are connected to the communication

network N1, the communication part 103 receives the image data transmitted from the PC 2 through the communication network N1, and the image forming part 108 is capable of forming an image from the image data received by the communication part 103 and
5 outputting the image, whereby the printer 1 functions as a network printer. Moreover, the printer 1 is capable of transmitting the image data generated by the image reading part 107 reading an image, from the communication part 103 to the PC 2 through the communication network N1, thereby functioning as a network
10 scanner. Moreover, the communication part 103, which is capable of facsimile communication, is capable of transmitting the image data generated by the image reading part 107 reading an image, to another facsimile 3 connected to a public network N2 connected to the communication network N1 by facsimile communication through
15 the public network N2. Moreover, the image data transmitted from the facsimile 3 by facsimile communication is received through the public network N2, and the image forming part 108 is capable of forming an image from the image data received by the communication part 103 and outputting the image.

20 Moreover, the printer 1 is provided with a main power 110, and the main power 110 receives power from the external commercial power and supplies power to the entire printer 1. Further, the printer 1 is provided with a backup part 105 which is an auxiliary power other than the main power 110, and the backup part
25 105 which is connected to the management part 104 supplies power

to the management part 104 for a predetermined time by use of the external commercial power source or an internal power source in case that the main power 110 is turned off, so that when the power supply from the main power 110 is resumed in the predetermined
5 period, the processing can be resumed under a condition where the information stored in the management part 104 is maintained.

FIG. 2 is a schematic view showing the processing performed by the printer 1 in case that an image is outputted. In case that outputting an image on an instruction from the external PC 2, the
10 printer 1 receives image data and job information from the PC 2 by the communication part 103 through the communication network N1. In the figure, flows of the image data are indicated by thick arrows, and flows of the job information are indicated by thin arrows. Moreover, the image read by the image reading part 107 is outputted,
15 the image data is accepted from the image reading part 107, and the job information is accepted from the operation part 102. The control part 101 stores the accepted job information in the management part 104 as a job management table in which the job information is summarized by being assigned a management
20 number in the order of acceptance. Moreover, the control part 101 encrypts the accepted image data in accordance with the control program stored in the ROM 109, stores the encrypted image data into the storage part 106, and information on the storage area representative of where in the storage part 106 the image data is
25 stored is added to the job management table.

FIG. 3 is a conceptual diagram showing an example of the contents of the job management table stored in the storage part 105. The job information accepted by the printer 1 includes information such as the date of acceptance, the requester representative of the PC 2 which is the transmitter of the job information, the image size, the number of sheets of the image in case that the image is outputted onto recording sheets and the number of copies, and is recorded in a condition of being assigned a management number in the order of acceptance. Moreover, the storage area of the image data associated with each job information is recorded, so that the image data to be outputted as an image can be referred to. Further, for each job information, a normal mode or a confidential mode is set as an image output mode. The confidential mode is a mode in which the job information including a password is transmitted from the PC 2 and in case that the same password is accepted by the operation part 102, the image is outputted, and the password received from the PC 2 is recorded. In case that storing the job management table into the storage part 105, the control part 101 assigns a processing number to the job information while giving higher priority to the job information for which the normal mode is set.

The control part 101 selects, in accordance with the control program stored in the ROM 109, the job information in the order of the processing numbers with reference to the job management table stored in the management part 104, reads out the encrypted image

data stored in the storage area of the storage part 106 represented by the selected job information, decrypts the image data being read out, forms an image by the image forming part 108 from the decrypted image data, and outputs the image in accordance with the contents of the job information. The control part 101 deletes, in accordance with the control program stored in the ROM 109, the job information for which the processing is finished, from the job management table stored in the management part 104, and selects the next job information. For the job information for which the confidential mode is set, the process waits until an output instruction from the user is accepted by the operation part 102, and in case that the output instruction is accepted, in accordance with the control program stored in the ROM 109, the control part 101 outputs a password input request onto the display means of the operation part 102, and performs the image output processing associated with the job information in case that a password coinciding with the password recorded on the job information associated with the output instruction is accepted by the operation part 102. The job information for which the confidential mode is set continues being recorded in the job management table until a correct password is accepted by the operation part 102 and the processing is performed.

Various functions of the printer 1 as described above are controlled by the control part 101 in accordance with the control program stored in the ROM 109, and in the printer 1 which is an

information processing apparatus of the present invention, the control part 101 is capable of performing control in accordance with a security program for improving security in addition to the control program. By replacing the ROM not storing the security program with a ROM 109 storing the security program or by accepting by the operation part 102 an instruction to execute the security program stored in the ROM 109, the control part 101 can control the printer 1 in accordance with the security program stored in the ROM 109. The control part 101 operates as the invalidating means according to the present invention by following the security program stored in the ROM 109, and deletes the image data stored in the storage part 106 or performs a processing such as overwriting the image data with predetermined information to thereby invalidate the already-processed image data stored in the storage part 106 so as to be unusable. Moreover, since there are cases where even if the image data is deleted, the image data can be restored because of the magnetism remaining in the storage part 106, setting can be made so that the image data is deleted a plurality of times, for example, by overwriting it with random data.

In case that the security program is not executing, management information representing that the printer 1 is not in a condition where the security program executes is stored in the management part 104. Moreover, in case that the ROM 109 storing the security program is provided or in case that an instruction to execute the security program stored in the ROM 109 is accepted by

the operation part 102, the control part 101 stores, into the management part 104, management information representing that the printer 1 is in a condition where the security program executes. In the image output processing, the control part 101 checks the
5 management information stored in the management part 104, and determines whether or not the contents of the management information represent that the printer 1 is in a condition where the security program executes. In case that the printer 1 is in a condition where the security program executes, the control part 101
10 invalidates the image data for which the image output is finished, thereby ensuring the security of the information.

Further, in the present invention, in case that controlling the printer 1 in accordance with the security program, the control part 101 inhibits the backup part 105 from supplying power to the
15 management part 104 in accordance with the control program, and restarts the printer 1 under a condition where the job management table is deleted from the management part 104.

FIG. 4 is a flowchart showing the procedures of the operation for the printer 1 which is an information processing apparatus of the present invention to turn off the main power 110. In the printer 1,
20 an instruction for turning off the main power 110 is accepted by the operation part 102 (S1), and the control part 101 checks the management information stored in the management part 104 in accordance with the control program and the security program
25 stored in the ROM 109 (S2) and determines whether or not the

contents of the management information represent that the printer 1 is in a condition where the security program executes (S3). In case that the contents of the management information represent that the printer 1 is in a condition where the security program
5 executes (S3: YES), the control part 101 inhibits the operation of the backup part 105 and turns off the main power 110 in accordance with the control program and the security program stored in the ROM 109 (S4). In this case, since no power is supplied from the backup part 105 to the management part 104 and the main power
10 110 is turned off, the job management table stored in the management part 104 which is a memory is deleted. In case that the main power 110 is turned on again, since the job management table including the information on the storage area of the image data stored in the storage part 106 is deleted, the access to the image
15 data is difficult. In case that the contents of the management information do not represent that the printer 1 is in a condition where the security program executes at step S3 (S3: NO), the control part 101 operates the backup part 105 and turns off the main power 110 in accordance with the control program and the security
20 program stored in the ROM 109 (S5). In this case, since the job management table is held, the stored image data can be processed after the restart of the printer 1.

As described above in detail, in the printer 1 which is an information processing apparatus of the present invention, after a
25 password is accepted from the PC 2 together with the image data

and the job information, the image data is encrypted and stored in the storage part 106, the job information is associated with the password and stored in the management part 104 as a job management table, the process waits, and in case that the security program is executable, the operation of the backup part 105 to supply power to the management part 104 is inhibited in case that the main power 110 is turned off, thereby deleting the job information table stored in the management part 104. In case that the printer 1 is restarted, since the job management table including the information on the storage area necessary for reading out the image data is deleted, it is difficult to read out the image data stored in the storage part 106. Consequently, in case that unprocessed image data is stored in the printer 1 such as in case that the user who transmitted the image data from the PC 2 to the printer 1 forgot to output the image, the image data is prevented from continuing being stored in a condition where it can be taken out to the outside even after the power is turned off and the printer 1 is restarted, so that the confidentiality of the information to be processed can be maintained. Moreover, in case that the security program does not execute such as when the printer 1 is used for purposes not requiring that confidentiality be maintained, the job management table stored in the management part 104 is protected by the backup part so that the image output is enabled even after the restart, thereby maintaining convenience. Further, since the storage part 106 stores the image data in a condition of being encrypted, even

when the security program does not execute, it is difficult to take out the image data to the outside for use, and it is facilitated to maintain the confidentiality of the information.

While in the present embodiment, a method is used in which
5 the job management table is protected by supplying power from the backup part 105 to the management part 104, the present invention is not limited thereto; a method may be used in which the job management table is protected by storing the job management table in another nonvolatile storing means. Moreover, at this time, a
10 method may be used in which the kind of the job information included in the job management table is determined and job information to be protected is selected based on the kind of the job information such as determining whether the job information is job information of normal output or job information of confidential
15 output with reference to the contents of the job information, storing only the job information of normal output in the nonvolatile storing means and protecting it. Moreover, as the method of deleting the job management table, a method may be used in which the job management table is forcibly deleted in case that the main power
20 110 is turned off or at the time of restart. Further, while in the present embodiment, a method in which only the job management table is deleted is shown, the present invention is not limited thereto; a method may be used in which the image data itself is deleted in addition of the job management table by the turning off of
25 the power. In this case, the confidentiality of the information to be

processed can be more reliably maintained.

INDUSTRIAL APPLICABILITY

As described above in detail, according to the present
5 invention, in an information processing apparatus provided with:
storing means for storing unprocessed information; and resuming
means for resuming, in case that processing is resumed such as
when the power is shut off and turned on again, the information
processing under a condition where the unprocessed information is
10 stored in the storing means, in case that invalidating means for
invalidating the processed information is operable, the operation of
the resuming means is limited, part or all of the unprocessed
information is deleted and the information processing is resumed.
By resuming the processing under a condition where part or all of
15 the unprocessed information is deleted, the information associated
with the processing is prevented from continuing being stored in a
condition where it can be taken out to the outside, thereby
maintaining the confidentiality of the information to be processed.

Moreover, according to the present invention, the resuming
20 means maintains the unprocessed information so as not to be lost
even while the power is shut off to thereby enable the performance of
the processing of the information that the process waits to perform,
so that convenience is maintained.

Moreover, according to the present invention, data to be
25 processed such as image data, and associated information including

information necessary for reading out data such as an address where the data is stored are stored in the storing means, and in case that the invalidating means is operating, the processing is resumed under a condition where the associated information is deleted. The
5 associated information is lost after the restart, so that it is difficult to read out the data. This prevents the information associated with the processing from continuing being stored in a condition where it can be taken out to the outside, thereby maintaining the confidentiality of the information to be processed.

10 Further, according to the present invention, by storing the data to be processed in a condition of being encrypted, it is made difficult to take out data such as image data to the outside for use in case that the invalidating means is not operating and it is facilitated to maintain the confidentiality of the information. Thus, the
15 present invention produces excellent effects.